

# Supplementary information

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Figure S1. Photographs of the pure wood evaporator and the bilayered wood-PEDOT:PSS hydrogel evaporator.

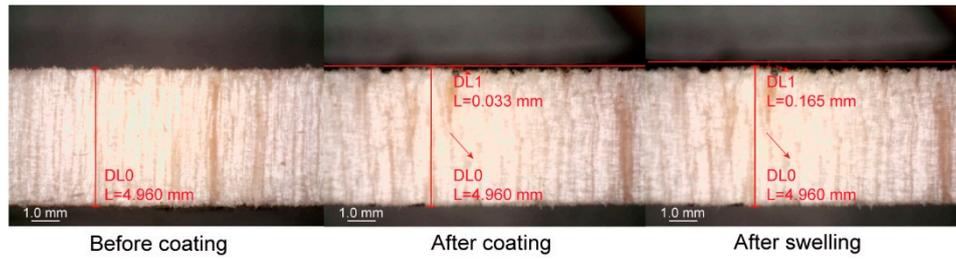


Figure S2. Photographs of wood sections with 4 layers of PEDOT:PSS hydrogel both before and after the coating, as well as following hydrogel swelling.

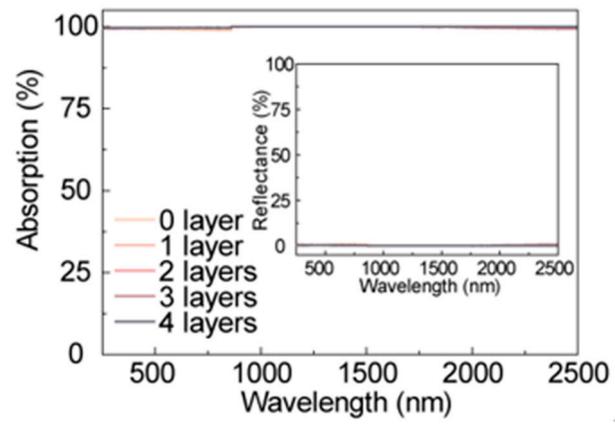


Figure S3. UV-vis-NIR absorption spectra in the wavelength range of 250-2500 nm. Inset: reflection spectra.

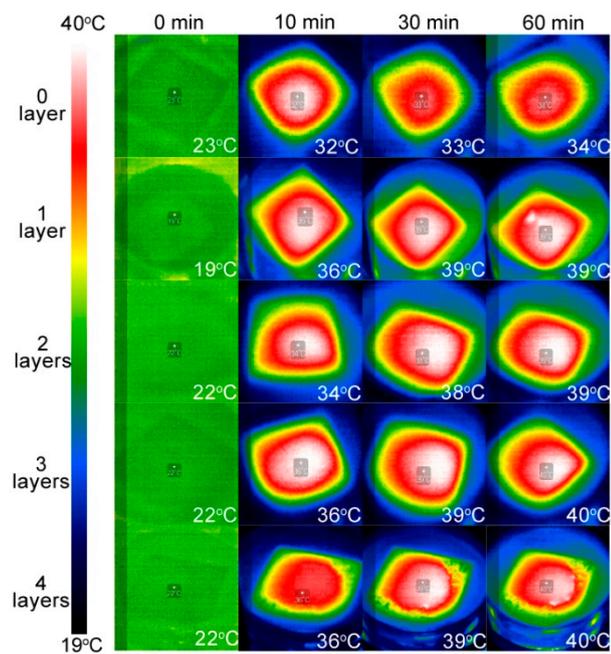


Figure S4. IR imaging of the surface temperature distribution for PEDOT:PSS hydrogels under one sun irradiation time at 0, 10, 30, and 60 min.

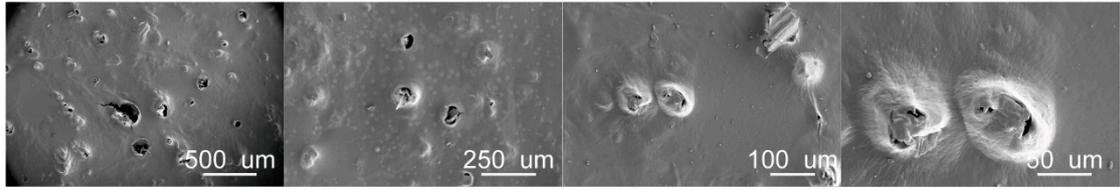


Figure S5. SEM images of the bilayered wood-PEDOT:PSS hydrogel evaporator at different magnifications.

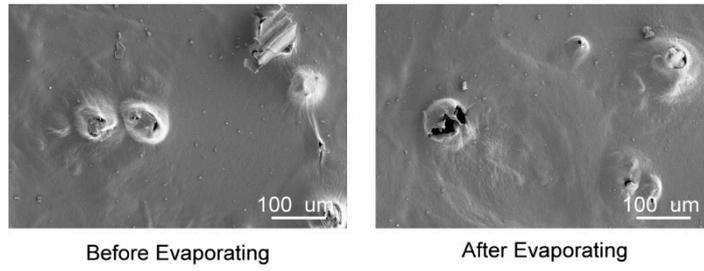


Figure S6. SEM images of the bilayered wood-PEDOT:PSS hydrogel interfacial evaporator before and after evaporating.

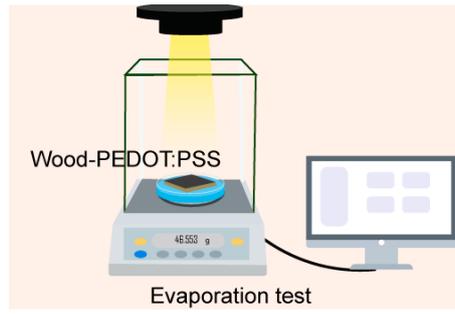


Figure S7. The schematic diagram of the evaporation test.

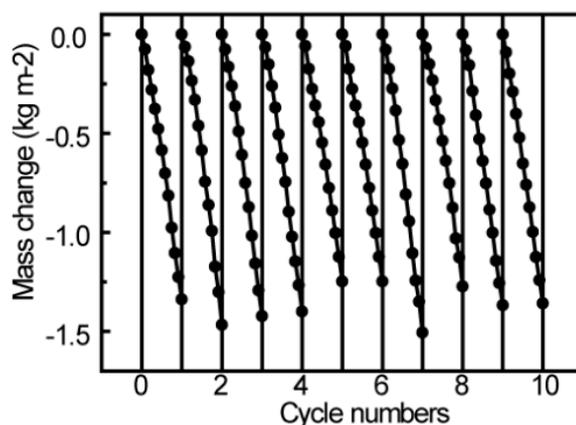


Figure S8. Stability testing of wood-PEDOT:PSS hydrogel solar evaporator for 10 days.

**Long-term reliability and stability of the bilayered wood-PEDOT:PSS hydrogel evaporator via 10-day continuous monitoring:** The bilayered wood-PEDOT:PSS hydrogel evaporator was placed on the surface of the simulated seawater outdoors from 11 pm to 7 am (overnight), and then the steam generation performance was tested under simulated solar irradiation of  $1 \text{ kW m}^{-2}$  for 1 h (typically from 8 pm to 9 pm). After the test, the system was again disposed of outdoors for the following tests. From the results (Figure 4b and S8), the evaporation rate was determined to be  $\sim 1.358 \text{ kg m}^{-2} \text{ h}^{-1}$ , exhibiting a marginal decrease of  $\sim 0.11 \text{ kg m}^{-2} \text{ h}^{-1}$  compared to the initial value of  $\sim 1.47 \text{ kg m}^{-2} \text{ h}^{-1}$ . Additionally, the average vapor generation rate was approximately  $\sim 1.36 \text{ kg m}^{-2} \text{ h}^{-1}$ , corresponding to an average energy efficiency of  $\sim 70.32\%$ .